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HINTS TO SETTLERS ON THE WILLISTON PROJECT,
NORTH DAKOTA.

INTRODUCTION.

To those owning farms under the Williston Irrigation Project it is the purpose of this circular to offer a few suggestions as to what crops to grow and what live stock to keep, and in a general way to indicate some types of farming that will probably be successful. Even were the necessary information available it would not be possible in a short article to outline all the types of farming adapted to this Project, but it is hoped that the few suggestions offered may be helpful.

SIZE OF FARM.

The production of crops is not only more certain and the yield considerably larger under irrigation, but the labor involved is also much greater; consequently, it will be advisable to practice intensive rather than extensive farming. Considering income and labor, 40 acres under the ditch is probably equivalent to a farm of 160 acres where irrigation is not practiced.

SOIL.

The soil under this Project varies considerably. That on the low level land is very heavy and while rich is not adapted to as wide a range of crops as is the higher land. On the other hand, the higher land is more rolling and will not be so easily leveled for irrigation. As a rule the soil is rich enough to produce big crops, and the principal problem is to fit the crop to the soil.

For definite information concerning the types of soil on any 40 acres of land and their adaptability to particular crops, consult the Government Soil Survey of the Williston Area. The fertility of the soil may be maintained almost indefinitely without the aid of commercial fertilizers if meat, milk, butter, eggs, and fruit are the only products sold from the farm. If hay, grain, and potatoes are sold extensively, the soil must eventually run low in plant food, no matter how rich it may be at the start.

TYPE OF FARMING TO FOLLOW.

Dairying combined with hog raising and potato growing is a type of farming that promises success. A farmer should succeed if he has for his principal income 8 or 10 acres of potatoes, a number of hogs, and the product from a dairy of six or eight cows. He should also produce enough chickens, eggs, small fruit, vegetables, etc., for his own use and some for sale. Dairying has the advantage over almost any other type of farming in that it furnishes a constant income from the start.

WHAT FIELD CROPS TO PRODUCE.

In order to support a dairy of six or eight cows the following crops are suggested: Clover, alfalfa, barley, oats, Canada field peas and oats, fodder corn, and mangel-wurzels. Wild hay being plentiful and cheap in the vicinity of Williston, there will be no trouble in obtaining roughage for the cows during the time that must elapse before a crop of clover or alfalfa can be grown. In the book entitled "Feeds and Feeding," Dean Henry speaks very highly of ground barley as a feed for milch cows, and the writer while engaged in the dairy business in Fargo found no better feed for dairy cows than oats in the bundle, the oats being cut in the dough stage. Oats and Canada field peas make an excellent feed for dairy cows. In the absence of a silo there is no better feed than mangels to supplement the ration of dry hay and grain.

Hogs should do well if pastured on clover or alfalfa, but in order to have feed for them the first year a small piece of Canada field peas and oats should be sown. Ground barley is a highly satisfactory feed for fattening hogs, and in North Dakota may be used as a substitute for corn.

Clover or clover and timothy may be sown with barley, wheat, or oats as a nurse crop. Clover should be sown at the rate of from 12 to 15 pounds of seed per acre and about as shallow as it is possible to cover the seed. Medium red clover does not yield a crop the year it is sown, but the following year should give two heavy crops of hay, or one crop of hay followed by a crop of seed. As the crop next year is almost sure to be unsatisfactory it will be advisable to plow it up for corn, potatoes, and mangel-wurzels.

Alfalfa is a very satisfactory crop under irrigation, and should be grown extensively under this Project. From 15 to 20 pounds of seed per acre should be sown in the spring; under irrigation with a nurse crop, elsewhere without a nurse crop. As alfalfa is likely to yield good returns for six or eight years, this crop should be kept as a permanent pasture for hogs or as a meadow. It makes a suitable pasture for hogs and horses, but not for cattle and sheep. As a hay crop grown under irrigation alfalfa gives a heavy yield and in its feeding value is unexcelled.

Canada field peas if sown with oats at the rate of 2 bushels of peas to 1 of oats per acre will furnish a large quantity of feed for hogs and also make a very satisfactory cow feed. Canada field peas are grown as a pasture crop for hogs, but for cattle are usually grown as a hay crop. The three crops just described—clover, alfalfa, and Canada field peas—are all soil improvers. These crops take nitrogen from the air and store it in the ground where it is available for the use of succeeding crops.

In the spring as soon as the ground can be worked, mangel-wurzels are planted in rows about 2 feet apart to permit of horse cultivation, and thinned to 12 or 14 inches in the row, from 4 to 6 pounds of seed being required per acre. They grow partly out of the ground and are therefore easily harvested. The crop should be pulled before heavy frosts set in. Under favorable conditions mangel-wurzels give heavy yields, and they are a satisfactory substitute for silage. If grown for winter feeding some arrangement must be made for storing them where they can not be frozen. A large outdoor storage cellar is recommended. It may be made in a sidehill, the walls being built of stone and the roof

of alternate layers of straw and earth, the roof being strongly supported. The storage cellar should be large and easy of access.

While the season in Williams County is short for the production of Indian corn, there are several early varieties that may mature in seasons of average length. Of the early maturing corn adapted to the climate of North Dakota, the following are the flint varieties in order of earliness, beginning with the earliest: Squaw Corn, Will's Dakota, Jehu, Mercer, Triumph, Longfellow, and King Philip. The early maturing dent varieties, named in the same order, are Station No. 100, Golden Dent, Minnesota King, Northwestern Dent, and Pride of the North. Of these varieties—Mercer Flint, Golden Dent, and Northwestern Dent will probably give the best returns in all parts of the State where climatic conditions will bring them to maturity.

If the soil is in good condition and the crop is well cared for, potatoes should yield 300 bushels per acre under irrigation. The unsalable potatoes will make satisfactory feed for cows. Potatoes do well on clover or alfalfa sod. The sod for potatoes should be manured the fall before planting and deep plowing practiced for this crop. It should be remembered that potatoes do not thrive on a heavy and compact soil; consequently, it will be found advisable to plant this crop on only the looser soils. Grains and grasses are better adapted to the heavier land.

As barley and oats are so well known and so commonly grown throughout the Northern States it will not be necessary to describe their culture.

Flax and wheat, the two great money crops of North Dakota, may be grown successfully under irrigation, but these crops are not well adapted to intensive farming on account of their relatively low money value per acre even when a large crop is grown. It may be well to produce these crops to some extent at first, but it will undoubtedly pay better to change to more intensive farming as soon as it is possible to do so.

ENSILAGE.

If one desires to keep a herd of ten cows or more it may be well to build a silo and fill it with clover and Canada field peas, or later with corn, as this crop can be grown successfully for silage in this part of the country under irrigation. With a herd of less than ten cows it will hardly pay to build a silo, and in that case root crops may be substituted for silage.

CROP ROTATION.

As alfalfa is to be grown for permanent pasture for hogs or for permanent meadow it of course will not fit directly into the regular rotation. On a 40-acre farm the following rotation is suggested: Grain, clover, cultivated crops. This will allow about 10 acres for alfalfa and 10 acres for each kind of crop grown in the rotation. The cultivated crops should consist of potatoes, corn, and mangel-wurzels. When it is desired to plow up the alfalfa field one of the other 10-acre fields may be sown to this crop and the alfalfa land brought into the rotation. In case it is desired to produce a greater acreage of cultivated crops than the rotation mentioned will allow, the crop of corn may follow potatoes, in which case there will be a four-year rotation consisting of potatoes, corn, grain, and clover.

BUILDING MATERIALS.

On account of the great quantity of stone suitable for building purposes found on the hills adjoining this irrigated valley, stone should be used for building purposes wherever practicable. Sod may be used, but sod buildings are not durable or satisfactory.

REFERENCES.

For further information concerning the production of small fruits, vegetables, and live stock the Williston Experiment Station should be visited or a letter of inquiry addressed to the North Dakota Agricultural Experiment Station, Agricultural College, N. Dak., or to the United States Department of Agriculture, Washington, D. C. The Reclamation Service has an office at Williston, where the Project engineer can be consulted on all matters relating to maintenance and operation.

SUMMARY AND SUGGESTIONS.

- (1) Intensive farming should be practiced. From 40 to 60 acres properly and intelligently cultivated is enough land for each family.
- (2) For information concerning soil types see the Soil Survey of the Williston Area. Proper care of the soil will maintain its fertility almost indefinitely.
- (3) One good system of farming for the lands in the Williston Irrigation Project is a combination of dairying, hog production, and potato growing.
- (4) Chickens, eggs, vegetables, small fruit, etc., should be grown in sufficient quantities for home use and may also be profitably produced for the market.
- (5) Six or eight cows can easily be kept on a 40-acre farm, will furnish a fair income from the start, and will not burden the farmer with so much work as to interfere with other operations.
- (6) Hogs pastured on clover or alfalfa and fattened on barley are profitable.
- (7) Note the suggestions offered as to the best methods of producing clover, alfalfa, Canada field peas, and mangel-wurzels.
- (8) Potatoes grown on well-manured land and under irrigation usually yield large crops. Apply manure to the soil the fall before growing a crop of potatoes.
- (9) Corn is still in the experimental stage, but if the early varieties are grown much feed may be produced.
- (10) Flax and wheat, the two great money crops of North Dakota, are not well adapted to intensive farming.
- (11) It is doubtful whether it will pay to build a silo.
- (12) A three-year rotation consisting of grain, clover, and cultivated crops is recommended.

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Approved:

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